REMARKS

In response to the Office Action mailed March 31, 2004, Applicants amend their application and request reconsideration. In this Amendment no claims are cancelled and claims 23-28 are added, so that claims 1-3, 8, 9, 13, 14, 17-19, and 23-28 are now pending.

Claim 17 was objected to as depending from a cancelled claim. The error is regretted. As intended, the dependency of claim 17 is changed to claim 13, a claim still pending.

In addition to the amendment of claim 17, each of the three independent claims is amended to eliminate non-essential limitations and to clarify the maximum dimension of the superparamagnetic nano-particles. In view of these amendments, corresponding amendments are made in claims 2, 3, 14, and 19. Claims 23-28 are added and essentially restore former claims 4, 15, and 20 to the patent application and add the limitation removed from claims 1, 13, and 18 as unnecessary.

The title of the application is changed merely to improve its form.

The Invention

Three independent claims, claims 1, 13, and 18, are pending in this patent application. Claim 1 is directed to a composite material constructed to have a low dielectric constant. The material includes a matrix chosen from a group consisting of four polymeric materials specified in claim 1. Dispersed within the polymer matrix are non-spherical superparamagnetic nano-particles having a specified maximum dimension. The nano-particles are selected from a list of five metallic materials specified in claim 1. Claim 13 is directed to a semiconductor device including a semiconductor substrate and an insulator on the substrate and having the composition of the composite described in claim 1. Claim 18 is directed to an optical device including a layer of a transparent dielectric material that is the composite material of claim 1. As described in the patent application, the claimed composite has a low dielectric constant so that it can be employed in semiconductor materials and optical devices and provide superior performance, although those devices are miniaturized. In a particular application in semiconductor devices, the low dielectric constant materials are of particular importance as insulators between wiring lines.

The Prior Art Rejection

Claims 1-3, 13, 14, 18, and 19 were all rejected as unpatentable over Ritter et al. (U.S. Patent 5,316,699, hereinafter Ritter) in view of Bucha et al. (U.S. Patent Publication 2002/0028201, hereinafter Bucha), and Ullman et al. (U.S. Patent 6,103,537, hereinafter Ullman). Claims 8, 9, and 17 were rejected on the same basis and further in view of Hemmi et al. (U.S. Patent 5,886,173, hereinafter Hemmi). These rejections are respectfully traversed because they are legally erroneous. Each of the rejections relies upon two or three publications that are not analogous prior art and that cannot be properly applied in rejecting any pending claim as obvious.

Non-Analogous Art

Non-analogous art comprises publications and other sources of prior art that are not pertinent to a claimed invention and therefore would not be consulted by a person of skill in the art in producing an invention sought to be patented. Non-analogous art cannot properly be applied in combination with analogous art to reject a claim for obviousness. See MPEP 2141.01(a).

> "In order to rely on a reference as a basis for rejection of the Applicant's invention, the reference must either be in the field of the Applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." (*In re Oetiker*, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992)).

As made clear in *Oetiker*, and predecessor decisions, such as *In re Wood*, 202 USPQ 172 (CCPA 1979), and successor opinions, such as *In re Clay*, 23 USPQ2d 1058 (Fed Cir. 1992), determination as to whether a reference is analogous art requires the application of the two-part test listed above. If a reference is either in the same field of endeavor as the invention sought to be patented or is reasonably pertinent to the problem solved by the invention, then the reference is analogous prior art and may be properly applied in rejecting a claim for obviousness. Each of Bucha, Ullman, and Hemmi fails both of these tests. Therefore, none of those publications is analogous prior art, and none can be properly applied in rejecting any pending claim. When either of Bucha or Ullman is withdrawn as a reference, the rejections of all claims fail, requiring withdrawal of the rejections.

The Standard for Analogous Prior Art

In attempting to determine whether each of Bucha, Ullman, and Hemmi is analogous prior art, the decisions in *Oetiker* and *Clay* provide assistance in the application of the appropriate tests.

In *Oetiker*, a patent was sought for a hose clamp that differed from a prior art reference with regard to a pre-assembled hook that automatically disengaged when the clamp was tightened. A hose clamp without such a hook was disclosed in a patent granted earlier to Oetiker and was the primary reference. To supply the difference between that earlier patent and the invention, the Examiner relied upon a secondary reference describing a plastic hook and eye fastener for garments, a fastener that could be directly sewn to a fabric. The Federal Circuit refused to allow the use of the secondary reference concerning the garment fastener to establish *prima facie* obviousness because the Court concluded that the secondary reference was not analogous prior art. In reaching its conclusion, the Court agreed with the Board of Appeals that the secondary reference was not within the field of endeavor of the Appellant, i.e., did not concern hose clamps or similar art. Thus, there was no disagreement concerning the failure of the secondary reference to meet the first of the two alternative tests for determining whether a prior publication is analogous prior art.

The Court concluded that the secondary reference was not analogous prior art because it was not "reasonably pertinent to the particular problem with which the inventor was concerned." The Commissioner asserted that a "disengageable catch, such as that used by Oetiker, is a common everyday mechanical concept that is variously employed in door latches and electrical and other switches, as well as in the hook and eye apparatus disclosed by" the secondary reference. The Court rejected this argument and, instead, directed attention to "the reality of the circumstances," -- in other words, common sense -- in deciding which fields a person of ordinary skill would reasonably be expected to look for a solution to the problem facing the inventor." 24 USPQ2d at 1446. Since there was no evidence that a person solving problems in fastening a hose clamp would be motivated to consider garment fasteners, the Court concluded that the secondary reference was not analogous prior art, could not be applied in attempting to establish *prima facie* obviousness of Oetiker's claims, and reversed the rejection.

Similar reasoning was applied in *Clay*. Clay's invention was directed to filling "dead" volume between the bottom of a storage tank and its outlet port so that all of a stored liquid could be withdrawn from the tank. The invention employed a gel that is not attacked by the stored material and that could be removed from the empty tank by adding

a degrading agent. The primary prior art reference described the use of an inflatable bladder to fill the dead volume of a storage tank. The secondary reference described changing the permeability of the earth in the vicinity of oil deposits to improve oil recovery. The permeability was changed using a gel similar to that used in the invention. In this instance, contrary to *Oetiker*, the Board found that the first of the two tests for analogous prior art was met by the secondary reference, i.e., that the invention and the secondary reference were directed to the same field of endeavor. The Court disagreed both as to that test and the alternative test for analogous prior art.

The only relationship between the invention and the secondary reference in *Clay* was that they both pertained to the petroleum industry. The secondary reference pertained to recovery of oil from the earth. The invention concerned storage of petroleum products. The Court held that this connection did not show that the reference was directed to the same field of endeavor as the invention. Thus, *Clay* makes even clearer than *Oetiker* that for a secondary reference to be in the same field of endeavor as an invention, the reference must have more than a generalized relationship to the invention.

In applying the second analogous art test, i.e., whether a secondary reference is directed to the same problem that the inventor was attempting to solve, the Court in *Clay* provided some guidance.

> "A reference is reasonably pertinent if, even though it may be from a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem. Thus, the purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve. If a reference disclosure has the same purpose as the claimed invention, the reference relates to the same problem, and that fact supports use of that reference in an obviousness rejection. If it is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it." 23 USPQ2d at 1061.

The Court readily concluded that the problem to which the secondary reference in *Clay* was directed, i.e., recovering oil from rock, was not reasonably pertinent to the problem to which the invention was directed, preventing the loss of stored product in the

dead volume of a storage tank. Thus, the secondary reference could not properly be applied in an attempt to establish *prima facie* obviousness of the invention in *Clay*.

None of Bucha, Ullman, or Hemmi is Analogous Art to the Claimed Invention

As already described, the invention disclosed and claimed in the present application falls generally within field of low dielectric constant materials that are applied in semiconductor devices and optical devices which exploit the dielectric constant of the material. The problem solved in the invention is how to achieve a low dielectric constant material for use in these kinds, i.e., semiconductor and optical, of devices.

Bucha fulfills neither of the two tests applied to determine if Bucha may be analogous prior art. The field of the endeavor of Bucha is the filtration of certain liquids, particularly biological liquids. See paragraphs [0001] and [0002]. Thus, the field of the invention of Bucha is totally unrelated to the field of the present invention. The problem to be solved in Bucha is the filtering of certain cellular signal substances from biological liquids, including blood. This problem has no relationship to dielectric constant of any material nor to any semiconductor or optical device. The problem to be solved in Bucha has no relationship to the problem to which the presently claimed invention is directed. Thus, Bucha is not analogous prior art and cannot properly be combined with other references to reject any pending claim of the patent application.

Ullman, like Bucha, is directed to a biological invention. The field of the invention of Ullman is pharmacological assays, particularly assays of enzyme binding. There is not even the most remote connection between the field of the invention disclosed and claimed in the present patent application and the field of the endeavor of Ullman as disclosed in columns 1 and 2 of Ullman.

Further, the problem to which Ullman is directed, i.e., improving the sensitivity of assays for particular analytes and food ingredients, has no connection whatsoever to dielectric constants of materials nor the exploitation of those dielectric constants in electrical and optical devices. Ullman is clearly not analogous prior art and its application in an obviousness rejection of the pending claims is legally erroneous.

It is apparent from the Office Action that both Bucha and Ullman are essential to rejections all of the pending claims. The Examiner acknowledged at pages 3 and 4 of the Office Action that Ritter did not disclose the matrix materials of the claimed invention or the composition of the superparamagnetic nano-particles. It is for those important limitations of the claims that reliance has been improperly placed upon Bucha and Ullman. Thus, upon the withdrawal of Bucha and Ullman from the rejections, because those publications are

non-analogous art that cannot be applied in rejecting any claim, it is apparent that all pending claims must be allowed.

Finally, although only dependent claims 8, 9, and 17 were rejected based upon Hemmi, Hemmi, like Bucha and Ullman, is not analogous prior art. The field of endeavor to which Hemmi is directed is improvement in the yield of a chemical reaction in order to reduce the waste products produced in the chemical reaction, an environmentally undesirable situation. No claim of the patent application is directed to a chemical reaction. Thus, the field of the endeavor of Hemmi is totally different from the field of the present patent application and the claims under examination. The problem to be solved in Hemmi is the metallization of organic materials, particularly for use in magnetic resonance image contrast media. The invention as described and claimed employs particles that may be metallic, but they are not metal coated organic particles. Thus, there is no relationship between the problems solved in the invention and in Hemmi. Therefore, even the application of Hemmi in the rejection of three dependent claims cannot be legally maintained because Hemmi is not analogous art.

Additional Observations

The Office Action at page 3, line 7 makes reference to "ferrite nitride". Presumably it was intended to make reference to "ferric nitride". There is no such thing as ferrite nitride and the reference to ferric nitride has no relevance to the invention claimed.

The non-analogous art references relied upon in the rejections for obviousness seem to have been cited based upon specific materials described in each of those publications. Perhaps these publications were identified through computer searching based upon particular keywords. While such searching may identify publications mentioning particular materials, the results of such searches are frequently, and here, misleading. The present disclosure does not claim to have invented any of the compounds mentioned in the claims. Rather, what has been invented is an important material composition including the elements disclosed and claimed that provide a substantial advantage over the prior art with regard to achieving a low dielectric constant material. Essentially, no invention directed to a composite material, as in the presently claimed and disclosed invention, would be patentable if only prior existence of the constituents of the composite material were required. Yet composites must be made of known materials. The invention is in the combination of the constituent materials, not the materials themselves.

The composite described and claimed in the present patent application includes important advantages that are not achieved in the prior art. The structure as well as the

advantages cannot possibly be disclosed or suggested in publications directed to filtration, biotechnology, and pharmacology where dielectric constant is rarely of any importance. Certainly, none of Bucha, Ullman, or Hemmi give any reason to believe that dielectric constant is ever a consideration with regard to the improvements disclosed in those publications. If the Examiner intends to make a further search and cite new prior art publications, Applicants respectfully request that the search be focused upon and limited to analogous prior art since the claims now pending are clearly directed to a novel and non-obvious composite and two structures, semiconductor devices and optical devices, incorporating that composite.

Conclusion

The rejections as to all claims now pending are legally erroneous and should be withdrawn. In view of the lengthy prosecution of this patent application (four substantive Office Actions) and Applicants' clarification of the invention claimed in the course of the prosecution, all pending claims should now be allowed. Although an inadvertent error in claim 17 is corrected here and some amendments are made, essentially broadening the claims, there is no amendment in response to the rejections. Therefore, in the event the Examiner persists in rejecting the claims based upon still different publications or a different legal ground, the next Official Action should not be a final rejection.

Respectfully submitted,

Jeffrey A. Wyand, Registration No. 29,458
LEYDIG, VOIT & MAYER
700 Thirteenth Street, N.W., Suite 300
Washington, DC 20005-3960
(202) 737-6770 (telephone)
(202) 737-6776 (facsimile)

Date: June 28, 2004
JAW:ves